

## MODELS FOR THE 2001 FLANK ERUPTION OF MT. ETNA CONSTRAINED BY INSAR OBSERVATIONS

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We present modeling results for the large 2001 flank eruption of Mt. Etna volcano, Italy in order to understand the relation between magmatic and structural dynamics and the observed surface deformation. The foundation of this work lies in the rich satellite interferometric synthetic aperture radar (InSAR) set of observations available for the 2001 eruption. Specifically, the PI has led the analysis of more than 12 European Remote Sensing (ERS) satellite SAR scenes of Mt. Etna volcano that span the eruption. The Etna data set has generated more than 10 interferograms and yielded a relatively complete temporal record of its deformation. InSAR observations spanning its summit and flank eruption show that dike intrusion split the volcano, shoving aside the volcano's flanks over shallow basal faults. The richness of these data sets requires that we expand our modeling capabilities to account for complex structures and time dependence. In past work we have modeled the InSAR data through geometrically simple analytic solutions for spheroidal magma chambers and planar dislocations. In this current study we will expand our analysis to 3D finite element forward and inverse models. These models will address the relation between magma chamber dynamics and volcano structures. The exceptional InSAR data available, for Etna in particular, coupled with numerical modeling provide a unique opportunity to understand the relation between volcano deformation and eruption dynamics.